

# Ornamental use of silver birch with golden-veined or white-flecked leaves – mission impossible?

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*Native deciduous trees and shrubs with colorful summer foliage are favoured as ornamental plants in Nordic countries. The woody plants of more southern origin imported for landscaping often die during the deep winter temperatures or suffer from the spring frosts.*

## Introduction

Nowadays it is possible to micropropagate almost all the Nordic deciduous tree species, and several forms of native, well-adapted species are commercially available. The aim of this study was to clone two new decorative forms of native birch with specific leaf coloration.



Fig. 1. Leaves of the "Golden-veined" (GV) birch



Fig. 2. Leaves of the "White-flecked" (WF) birch.

## Material and Methods

The specific forms of *Betula pendula* Roth (Fig.1 and 2) were cloned by grafting and micropropagation, and their cryopreservability was tested. The leaf color of donor trees and their clonal progenies was observed yearly during the study.

Table 1. Summary of leaf color observations of GV and WF birches.

| Growing locations/<br>Plant material | Intensity of color expression |                          |
|--------------------------------------|-------------------------------|--------------------------|
|                                      | Golden veined (GV) birch      | White-flecked (WF) birch |
| <b>Donor trees</b>                   |                               |                          |
| Year 2003                            | strong                        | no obs.                  |
| Year 2004                            | strong                        | strong                   |
| Year 2005                            | strong                        | weak/variable            |
| Year 2006                            | strong                        | strong                   |
| <b>In vitro culture</b>              |                               |                          |
| Micropropagated shoots               | no expr.                      | no expr.                 |
| <b>Greenhouse</b>                    |                               |                          |
| Micropropagated plants               | no expr.                      | no expr.                 |
| Grafts                               | no expr.                      | no expr.                 |
| <b>Nursery</b>                       |                               |                          |
| Micropropagated plants               | no expr.                      | no expr.                 |
| Grafts, one-year-old                 | no expr.                      | no expr.                 |
| Grafts, two-years-old                | no expr.                      | no/variable              |

Fig. 3. 1-year-old micropropagated plants of GV birch in the greenhouse.

Fig. 4. White-flecked leaves on a 2-year-old stem of the grafted WF birch at the nursery.

## Results and discussion

All the methods were applicable for both forms. However, grafting of the WF birch was more successful, and its recovery following micropropagation and cryostorage was many times higher than that of the GV birch being only 6.3% and 6.9%, respectively. In the greenhouse and nursery, all the micropropagated progenies failed to express specific leaf coloration. The typical leaf coloration was, however, observed in the leaves growing on the 2-year-old parts of the WF birch grafts (Tab. 1, Fig. 3 and 4).

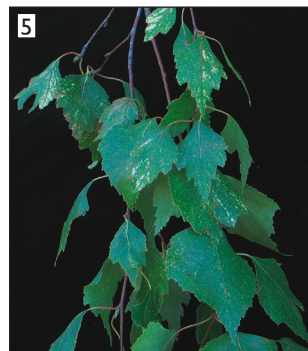


Fig. 5. Leaves of the WF donor tree after wet spring in 2005.

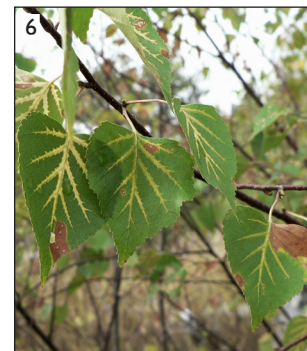


Fig. 6. Coloration of the GV donor tree after dry summer in 2006.

Leaf coloration was more pronounced on leaves growing in the mature parts of WF donor tree, too. In addition, moist environmental conditions diminished the expression of WF leaf coloration, as seen in the donor tree (Fig. 5). Coloration of the GV donor tree was unchanged from year to year, and no explanation to the absence of leaf variegation in the progeny has been found (Fig. 6).

Reference: Ryyänänen, L. & Aronen, T., 2007. Phenotypic expression of leaf variegation in two *Betula pendula* Roth genotypes following micropropagation, cryopreservation and grafting. Propagation of Ornamental Plants 7:23-28.

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